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(54) Multiple means for feature adjustment for a reproduction apparatus

(57) In reproduction apparatus (1) having a plurality of selectable features for carrying out a reproduction run, and an operator control panel (OCP) for providing operator interface for controlling the reproduction apparatus. The operator control panel (OCP) includes a touch-screen user input (104) having multiple ways for selecting or adjusting a feature option.

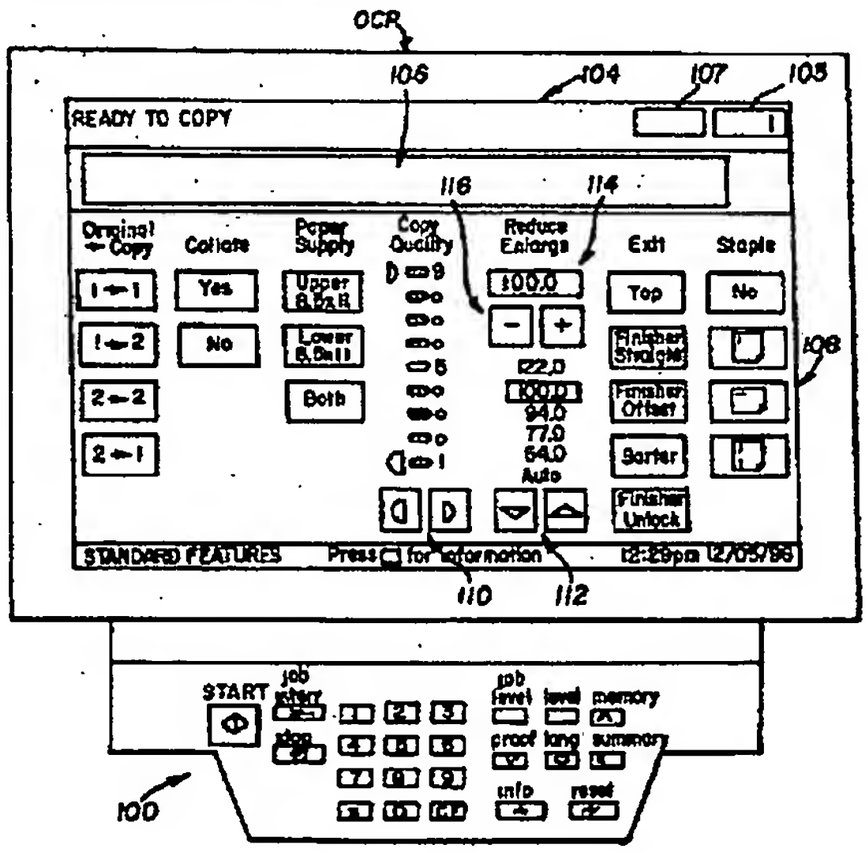

FIG. 3

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Description

The present invention relates, in general, to reproduction apparatus, and relates, more specifically, to electrographic reproduction apparatus having multiple means for feature selection or adjustment.

Electrographic reproduction apparatus are provided with an operator control panel for allowing an operator to program the apparatus for a reproduction run. In its simplest form, the control panel includes several dedicated (hard) buttons and switches for selecting features for a reproduction run, as well as visual indicators for informing the operator which features were selected. The operator control panel can also have a display for displaying messages. The control panel also includes keys and buttons for altering the display to indicate selected options. (See, for example, US-A-5,113,222.) The display may also include a touchscreen overlay having "soft buttons" for providing operator input to the reproduction apparatus. (See, for example, US-A-5,045,880; US-A-5,061,958; US-A-5,105,220; US-A-5,049,931; and US-A-5,010,551.)

A problem arises when all of the selections or adjustments for a particular feature cannot be displayed as touch areas within the optimal area range. In such a case, there is not enough room on the screen to display all selections (or adjustments) as touch buttons. Yet there is a need to maintain a consistent interface with the reproduction apparatus where the user selects a feature by touching that feature's soft button. Although the latter patents disclosing a touch screen user interface include both soft button input and feature scrolling with select button input, there is no disclosure of combining the two types of user interface for alternate selection of the same feature.

According to the present invention, there is provided a solution to the problems of the prior art by providing multiple means for selecting a feature in a touch screen user input to a reproduction apparatus.

According to a feature of the present invention, there is provided in a reproduction apparatus having a plurality of selectable features for carrying out a reproduction run, an operator control panel for providing operator interface for controlling said reproduction apparatus comprising:

a display for displaying at least one selectable feature for a reproduction run with plural displayed options for said at least one selectable feature;

a touchscreen overlaying said at least one selectable feature and having operator actuable touch areas overlaying said plural displayed options for providing operator input to said reproduction apparatus to select one of said feature options; and

a scroll touch button on said touchscreen for scrolling a visual indicator to highlight one of the feature options for said at least one selectable feature;

wherein a feature option of said at least one selectable feature can be selected either by touching said touch area associated therewith or by actuating said scroll button to select said feature option.

According to another feature of the present invention there is provided in a reproduction apparatus having a plurality of selectable features for carrying out a reproduction run, an operator control panel for providing operator interface for controlling said reproduction apparatus comprising:

a display for displaying at least two selectable features for a reproduction run with plural displayed options for each of said at least two selectable features;

a touchscreen overlaying at least said two selectable features and having operator actuable touch areas overlaying said plural displayed options for each said at least two selectable features for providing operator input to said reproduction apparatus to select one or more feature options, wherein said touch areas are substantially larger for one of said selectable features then for the other of said selectable features; and

a scroll button on said touchscreen for scrolling an indicator to identify one of the feature options for said other of said selectable features;

wherein a feature option of said one selectable feature is selected only by touching said touch area associated therewith; and

wherein a feature option of said other selectable feature can be selected either by touching said touch area associated therewith or by actuating said scroll button to select said feature option.

Figure 1 is a front perspective view of an electrographic reproduction apparatus for incorporating the present invention.

Figure 2 is a schematic diagram of the electrographic reproduction apparatus of Figure 1.

Figure 3 is a diagrammatic view of an operator control panel, including a display with a touchscreen.

Figures 4-7 are respective screens useful in explaining the present invention.

Because electrographic reproduction apparatus 1 are well-known, the present description will be directed, in particular, to elements forming part of or cooperating more directly with the present invention. Apparatus not specifically shown or described herein are selectable from those known in the prior art. Particular reference is made to US-A-4,740,818 and US-A-5,113,222, the contents of which are incorporated herein by reference.

With reference now to Figure 1, there is shown an electrographic reproduction apparatus 1 having a recirculating document feeder 50 that includes a tray portion for accepting a multi-sheet document original for reproduction. The apparatus 1 includes an operator control panel (OCP) which, as will be described, includes buttons and prompting displays for facilitating a job setup, that is, the input of an instruction set to the apparatus logic and control unit (LCU) to enable it to control a series of operations resulting in a desired copy output representing a reproduction of the document originals. Copies may be produced on receiver sheets stored in either or both drawers holding trays 23a and 23b. The copy output from the apparatus is stored either in an exit tray (ET) or

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finisher/sorter (F/S) having a series of sorter bins, as is well known.

Referring now to Figure 2, the electrographic reproduction apparatus of Figure 1 incorporating the present invention will be described in greater detail. As shown, reproduction apparatus 1 includes a photoconductive web 5 that is trained about six transport rollers 10, 11, 12, 13, 14 and 15, thereby forming an endless or continuous web. Roller 10 is coupled to a drive motor M in a conventional manner. Motor M is connected to a source of potential V when a switch SW is closed by a logic and control unit (LCU) 31. When the switch SW is closed, the roller 10 is driven by the motor M and moves the web 5 in clockwise direction as indicated by arrow A. This movement causes successive image areas of web 5 to sequentially pass a series of work stations of the apparatus 1. These workstations include: a charging station 17,17a at which the photoconductive surface 9 of the web 5 is sensitized by applying to such surface a uniform electrostatic charge of a predetermined voltage; an exposure station 18 at which a light image of a document sheet S, supported on transparent platen 2, is projected by mirrors 6, 8 and lens 7 onto the photoconductive surface 9 of the web 5 to produce a latent electrostatic image of the document sheet. Also included are a magnetic brush development station 19 at which the latent image is developed with developer which may consist of iron carrier particles and electroscopic toner particles with an electrostatic charge opposite to that of the latent electrostatic image, to form a toner image on web 5. A transfer station, including a corona charger 21 transfers the toner image on web 5 to a copy sheet S' which is transported to a heated pressure roller fuser 27 where the toner image is fixed to copy sheet S'. The sheet S' containing a fixed toner image is fed to a finisher/sorter or a top exit tray.

A cleaning station 25 is provided to clean the photoconductive surface 9 of web 5 of any residual toner particles remaining after the toner images have been transferred.

Copy sheet S' is fed from one of supplies 23a or 23b to continuously driven rollers 20 which urge sheet S' against a rotating registration finger 29 of a copy sheet registration mechanism 22, from which it is fed to the transfer station 21.

Apparatus 1 includes an additional color development station 19a, a duplex tray DT and a digitizer, including digitizer tablet 52, wand 54 and circuit 56 which provide digital signals to LCU 31.

Referring now to Figure 3, there is shown an operator control panel (OCP) which includes a set 100 of dedicated "hard" buttons or keys and a touchscreen display 104 to allow operator input and control of apparatus 1. The touchscreen display 104 includes (1) a known programmable type display wherein LCU 31 includes a computer program and a bit map memory for controlling the representation that is visible on the display and (2) a touchscreen which overlays the display. The touchscreen is an operator input device having operator actuable "soft" buttons and areas for providing operator input to the reproduction apparatus. Touchscreens are well known and include resistive, acoustic, and infrared type input technologies.

The operator selectable set of hard buttons on the left include, START, JOB INTERRUPT, and STOP buttons. In the middle are numerical buttons 0-9 to set the number of copies or sets to be copied. A * and CE (clear entry) buttons are also included. On the right are the following hard buttons; JOB LEVEL, PAGE LEVEL, MEMORY, PROOF, LANGUAGE, SUMMARY, INFORMATION and RESET. The INFORMATION (i) button accesses an information system (stored in memory in LCU 31) which provides detailed information about reproduction apparatus 1 including features selectable by the operator and messages which are displayed on touchscreen display 104.

As shown in Figure 3, the screen illustrated on the touchscreen display is referred to as the "standard features" screen as it displays various features that a casual user of the apparatus 1 would want when first approaching the apparatus for an average reproduction run. The screen includes a message display area 106, a copies or sets requested display area 105, a copies or sets completed display area 107, and a "soft" button area 108. The "soft" button area includes selectable features with plural displayed options for each feature. The features shown are original copy, collate, paper supply, copy quality, reduce/enlarge, exit, staple. The plural selected options for each feature are provided with operator actuable soft buttons overlaying the displayed feature options. The selected feature option is highlighted.

The copy quality and reduce/enlarge features are provided with respective scroll buttons 110,112 for scrolling through the feature options. The feature options are sequentially highlighted during scrolling. The reduce/enlarge feature also includes a zoom option 114 with scroll buttons 116.

Certain feature options may also be locked out to the operator, although displayed. Such feature option (for example, the "finisher unlock" option under the "exit" feature shown in Figure 3) is highlighted in a different manner than highlighted feature options.

Ideally, touchscreen technology allows for any area on the screen to be defined as an "active" or "touch" area. It has been found that optimally, "touch" areas to be used for user/operator input be no smaller than 13mm x 13mm to easily accommodate a finger tip. A problem arises when all of the selections or feature options cannot be displayed as "touch" areas within the optimal size range. In such a case, there is not enough room on the touch screen to display all selections as "touch Buttons". Yet there is a need to maintain a consistent interface where the user selects a feature by touching that feature's button.

According to the present invention, there is provided a solution to this problem by providing two methods for the user to make a feature selection, in the case where all selections can not be represented by a touch button

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that meets the optimal touch area size requirements. One method (illustrated with reference to Figs. 4 and 5) uses a scrolling operation and the other method (illustrated with reference to Figs. 6 and 7) uses a direct selection operation.

The first method for feature selection uses a stepwise progression through the feature options. Scroll buttons are provided as a means of navigating through the selections. As shown in Fig. 4, touch screen 200 displays several selectable features for carrying out a production run on a copier. Each of the features have one or more operator selectable options. For features such as "original copy", "collate", "paper supply", and so forth, the options are few enough in number to allow the option touch "buttons" (such as, buttons 202, 204, 206) to have an optimal area size. For features, however, such as "copy quality", and "reduce/enlarge", the options are numerous enough to prevent the use of such optimal area size touch buttons. Instead, each displayed option has a smaller touch area (such as touch areas 208 and 210), and each such feature is provided with scroll touch buttons (such as buttons 212 and 214) for scrolling a visual indicator through the feature options to highlight an option to be selected. As illustrated in Fig. 4, the option labeled "5" under the "copy quality" feature is highlighted. Using the scroll operation, the operator touches scroll button 212, to highlight the selected option, which is the next lower option. This operation is depicted by the circled numbers 1-3.

Figure 5 depicts an alternate scrolling format in which the feature/selection options are arrayed in a matrix 220 of rows and columns. The specific feature depicted is a job (reproduction run) having preselected reproduction features. The matrix depicts job numbers which are stored in an internal memory. A scroll touch button 222 scrolls through the matrix either row by row from left to right or column by column. The circled numbers 1-3 depict the steps to scroll from a "previous" job to a "current" job.

Although the scrolling method for feature selection allows the operator to access all of the feature options, it is necessary to step through preceding selections in the list or matrix to reach the desired selection. The second method for feature selection provides a direct path to the desired feature selection. Instead of using the scroll buttons to step through the selections, the operator need only touch the feature option within the array of options. This method is illustrated in Figures 6 and 7, which correspond to Figures 4 and 5. This method obviates the need to scroll through the previous list of feature options. It is, in essence, a short-cut provided for the more experienced operator.

Claims

1. In a reproduction apparatus (1) having a plurality of selectable features for carrying out a reproduction run, an operator control panel (OCP) for providing operator interface for controlling the reproduction apparatus comprising:

a display (104) for displaying at least one selectable feature for a reproduction run with plural displayed options for the at least one selectable feature;

a touchscreen (104) overlaying the at least one selectable feature and having operator actuable touch areas (108) overlaying the plural displayed options for providing operator input to the reproduction apparatus (1) to select one of the feature options; and

a scroll touch button (110),(112) on the touchscreen for scrolling a visual indicator to highlight one of the feature options for the at least one selectable feature;

wherein a feature option of the at least one selectable feature can be selected either by touching the touch area (108) associated therewith or by actuating the scroll button (110),(112) to select the feature option.

2. The operator control panel (OCP) of claim 1 wherein the plural displayed options of the at least one selectable feature are aligned in a row or column, and wherein the scroll touch button (110),(112) scrolls the visual indicator along the row or column to highlight a feature option.

3. The operator control panel (OCP) of claim 1 wherein the plural displayed options of the at least one selectable feature are aligned in a matrix of rows and columns, and wherein the scroll touch button (108) scrolls the visual indicator along the matrix rows and or columns to highlight a feature option.

4. The operator control panel (OCP) of claim 1 wherein the selectable feature for a reproduction run is either copy density or reproduced copy size.

5. In a reproduction apparatus (1) having a plurality of selectable features for carrying out a reproduction run, an operator control panel (OCP) for providing operator interface for controlling the reproduction apparatus comprising:

a display (104) for displaying at least two selectable features for a reproduction run with plural displayed options for each of the at least two selectable features;

a touchscreen (104) overlaying at least the two selectable features and having operator actuable touch areas (108) overlaying the plural displayed options for each the at least two selectable features for providing operator input to the reproduction apparatus to select one or more feature options, wherein the touch areas are substantially larger for one of the selectable features then for the other of

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